Tutorial
H-1000-5311-01-A

RENISHAW
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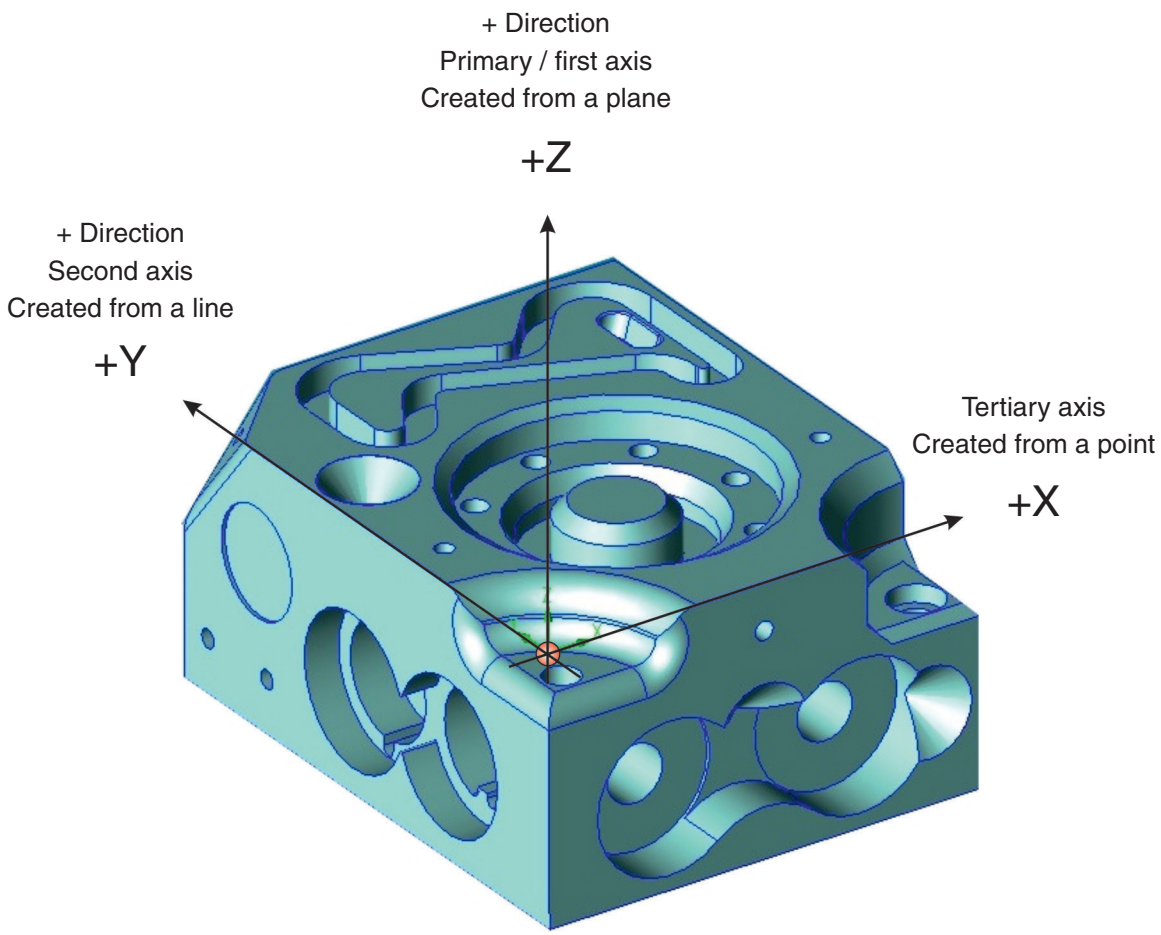
Part alignment - plane, line and point (non-CAD)



Renishaw part no: H-1000-5311-01-A

Issued: 12 2013

Part alignment - plane, line and point (non-CAD)

Care of equipment

Renishaw probes and associated systems are precision tools used for obtaining precise measurements and must therefore be treated with care.

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Renishaw plc warrants its equipment for a limited period (as set out in our Standard Terms and Conditions of Sale) provided that it is installed exactly as defined in associated Renishaw documentation.

Prior consent must be obtained from Renishaw if non-Renishaw equipment (e.g. interfaces and/or cabling) is to be used or substituted. Failure to comply with this will invalidate the Renishaw warranty.

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Contents

1 Part alignment - plane, line and point (non-CAD)

1.1 Tutorial pre-requisites

- The student should be familiar with the ‘Principles of part alignment’

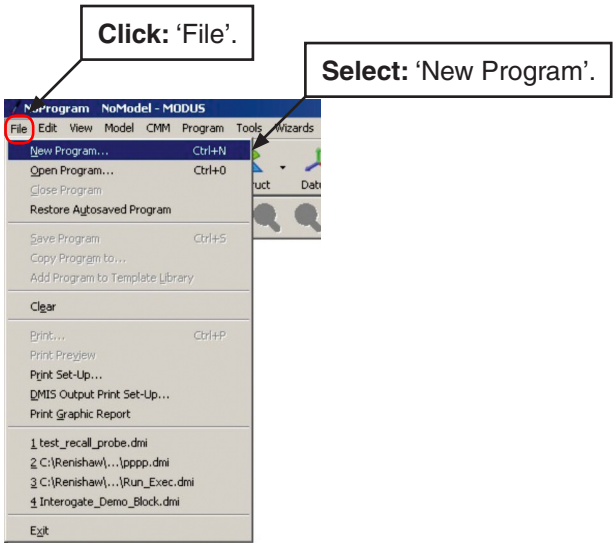
1.2 Tutorial objectives

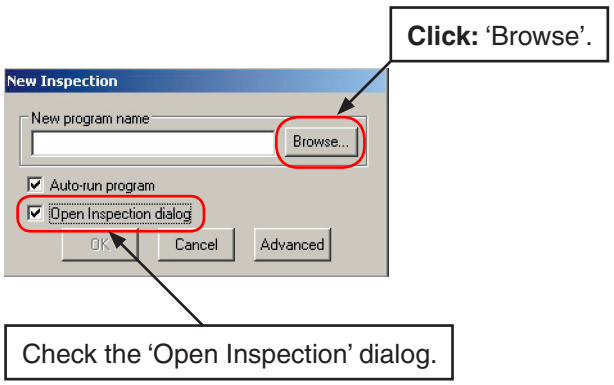
- Introduction to the fundamentals of creating a MODUS inspection program
- Concepts and definitions of nominal and actual features
- Familiarisation with text (DMIS) based programming
- Introduction of basic alignment operations

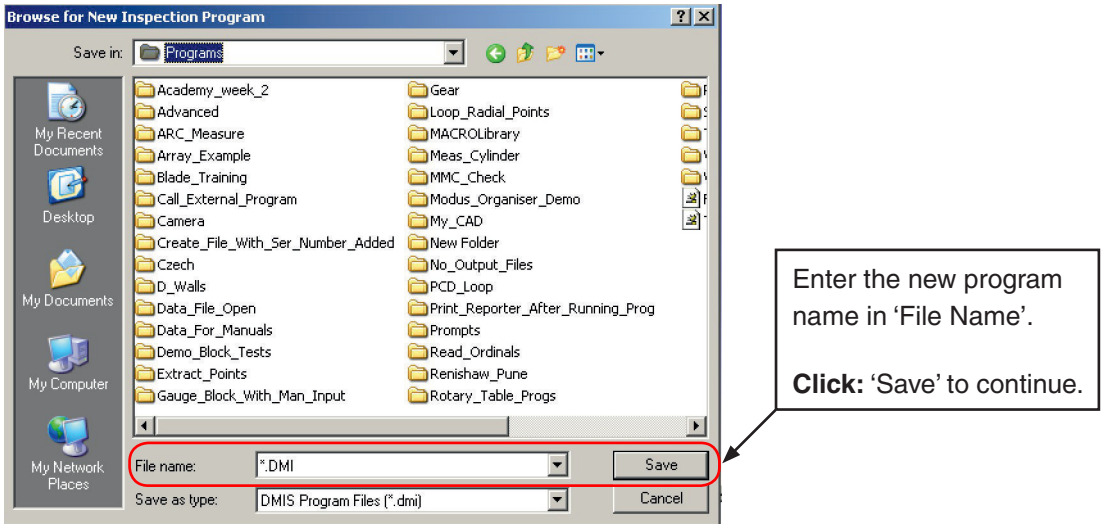
2 Introduction

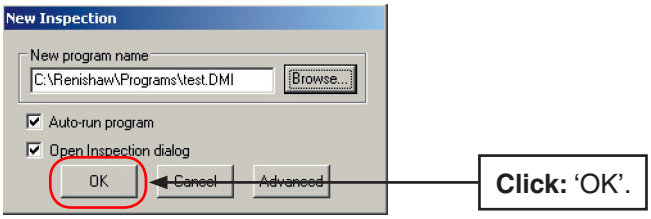
This tutorial introduces the student to manual measurement of features on the Renishaw training block and basic concepts of prismatic part alignment.

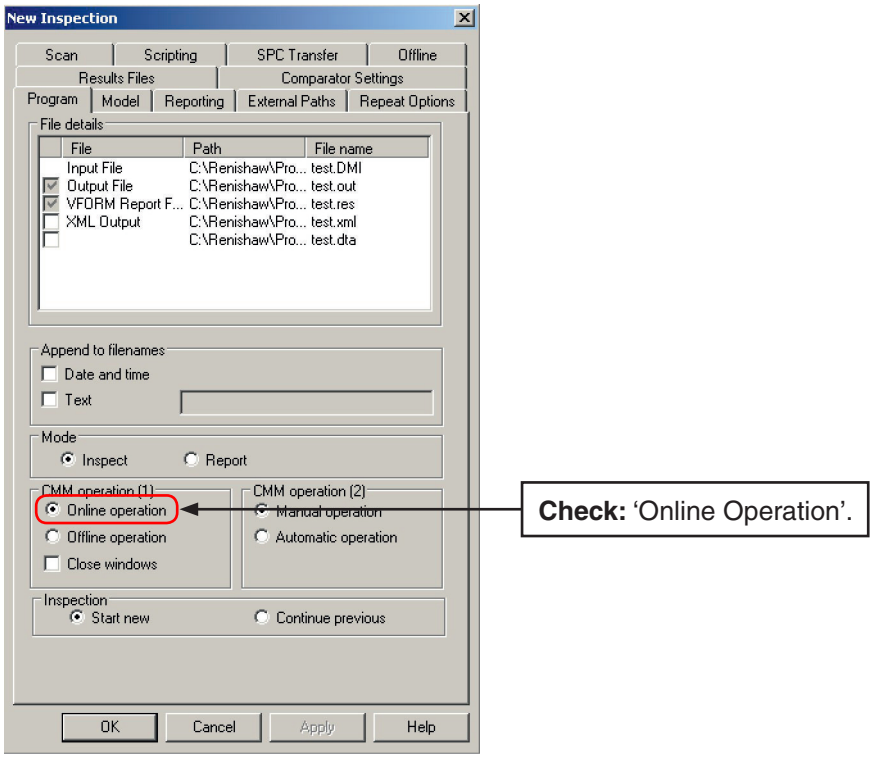
3 Create a new program











The following header will be inserted into the program:

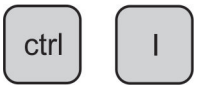
```
000001  DMISMN/'Start Template',05.2
000002  FILNAM/'Start Template',05.2
000003  DU(0)=DMESWU/'13,1,2,212'
000004  UNITS/MM,ANGDEC
000005  DECPL/ALL,DEFALT
000006  U(0)=VFORM/ALL,PLOT
000007  DISPLY/TERM,U(0),STOR,DMIS,U(0)
000008  SNSET/APPRCH,5
000009  SNSET/CLRSRF,15
000010  SNSET/DEPTH,0
000011  D(0)=DATSET/MCS
000012  MODE/MAN
000013  T(CORTOL_X1)=TOL/CORTOL,XAXIS,-0.1,0.1
000014  T(CORTOL_Y1)=TOL/CORTOL,YAXIS,-0.1,0.1
000015  T(CORTOL_Z1)=TOL/CORTOL,ZAXIS,-0.1,0.1
000016  T(DIAM_1)=TOL/DIAM,-0.1,0.1
000017  PAUSE
000018  ENDFIL
```

Info: This header can be edited to suit specific requirements.

it can be found in:-

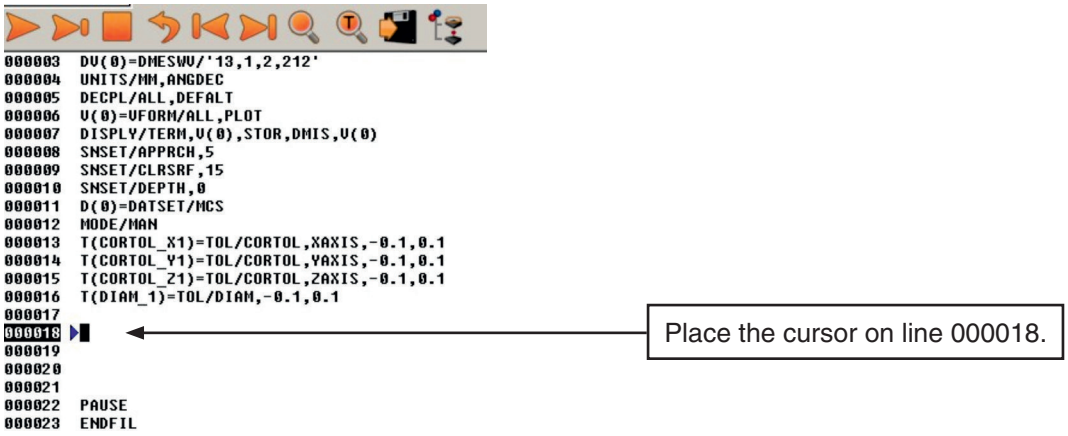
C:\Program Files\Renishaw\Modus\n,n\Template.dmi

Next insert some line spaces to make the program easier to read. Press:



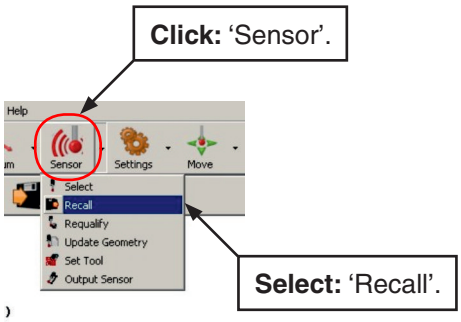
Put a space in the window.

Click: 'OK' to close and insert the line.



Place the cursor on line 000018.

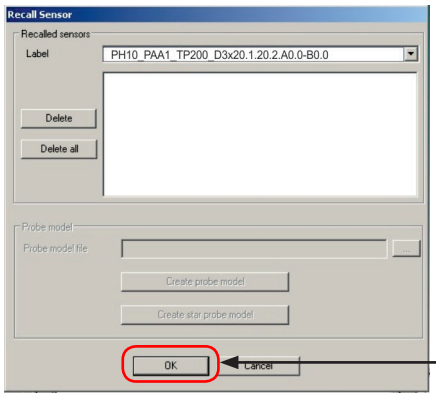
Recall the sensor:



Click: 'Sensor'.

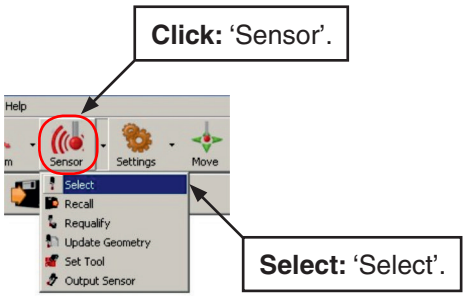
Select: 'Recall'.

Select the required sensor from the drop down menu:

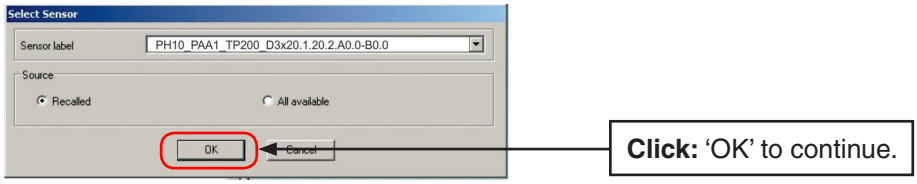


Click: 'OK' to continue.

Select the sensor:



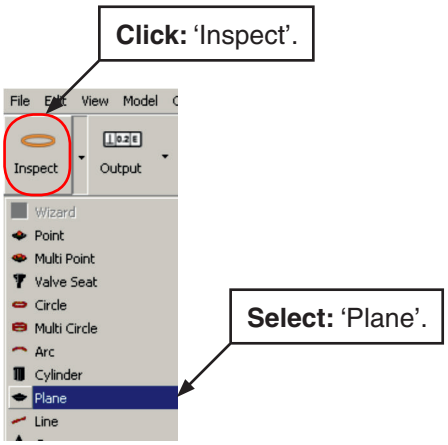
Select the required sensor from the drop down menu:



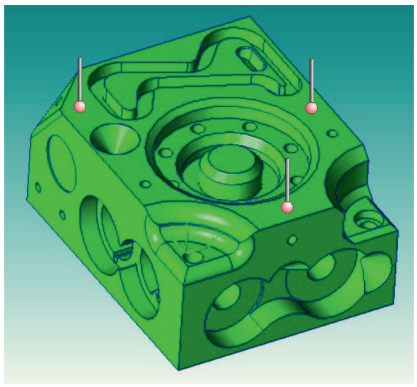

```
000012  MODE/MAN
000013  T(CORTOL_X1)=TOL/CORTOL,XAXIS,-0.1,0.1
000014  T(CORTOL_Y1)=TOL/CORTOL,YAXIS,-0.1,0.1
000015  T(CORTOL_Z1)=TOL/CORTOL,ZAXIS,-0.1,0.1
000016  T(DIAM_1)=TOL/DIAM,-0.1,0.1
000017
000018  RECALL/SA(PH10_PAA1_TP200_D3x20.1.20.2.A0.0-B0.0)
000019  SNSLCT/SA(PH10_PAA1_TP200_D3x20.1.20.2.A0.0-B0.0)
000020
000021
000022
000023  PAUSE
000024  ENDFIL
```

The program will now have two additional lines which recalls and selects the sensor.

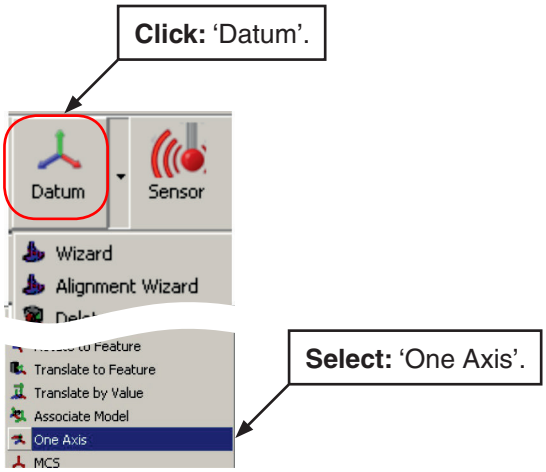
4 Measure a plane, line and point

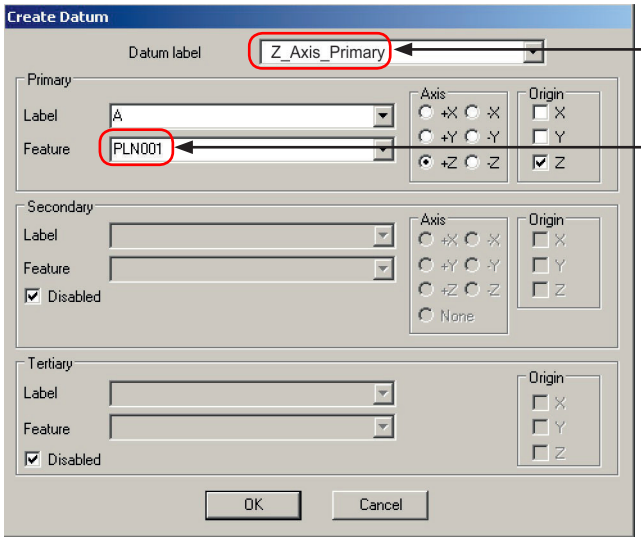


Take a minimum of 3 points on the plane:



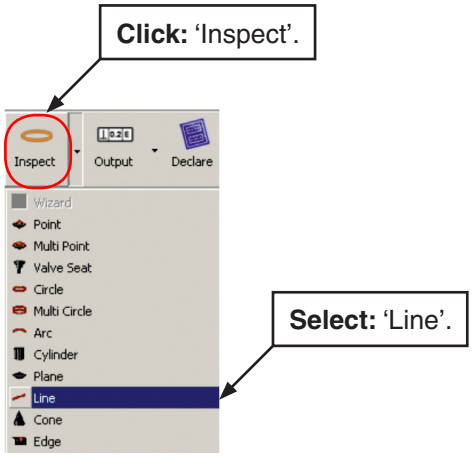
To create a primary axis on this feature click 'Datum' then select 'One Axis':



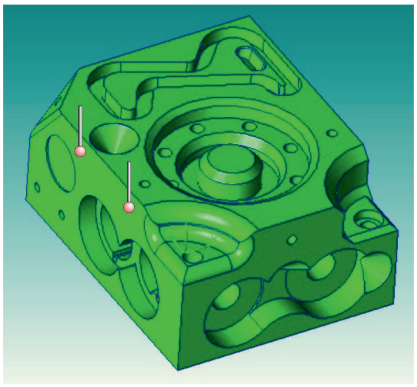


Give the new datum a label.

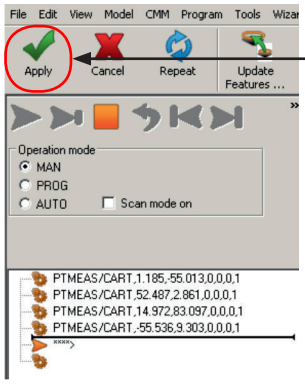
Measured feature.



Take a minimum of 2 points on the line:



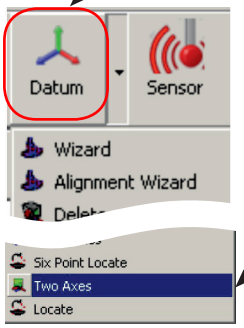
It is very important to take note of the direction when taking the points ie. front to back, back to front, left to right, right to left, + to - and - to +. This has a direct effect on the vector of the measured line and subsequent orientation of the part. If the next part is measured in the opposite direction then the part coordinate system would be rotated 180 degrees away from the original.



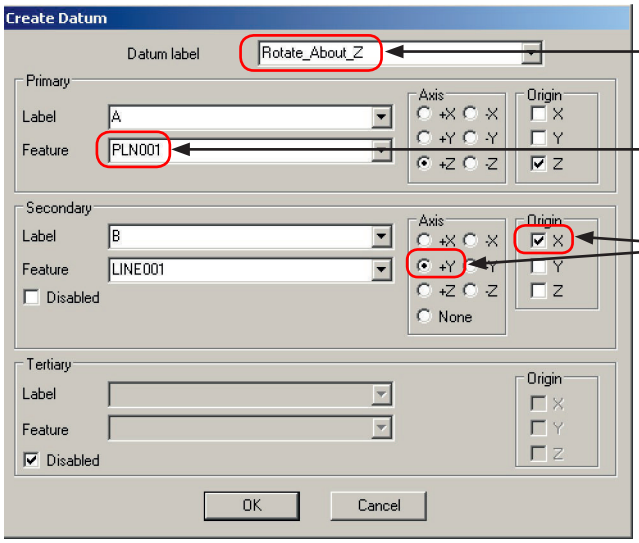
Click: 'Apply' to complete the measuring cycle.

To create a secondary axis on this feature click on 'Datum' then select 'Two Axes':

Click: 'Datum'.



Select: 'Two Axes'.

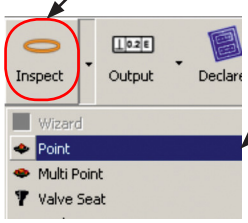


Give the new datum a label.

Measured feature.

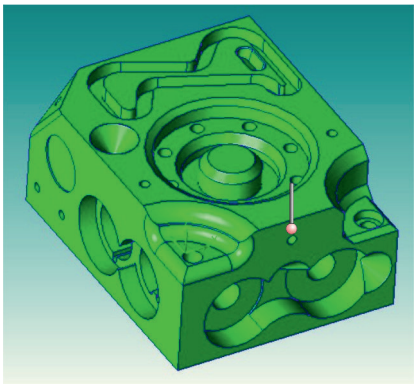
Set the Y direction with an origin on X.

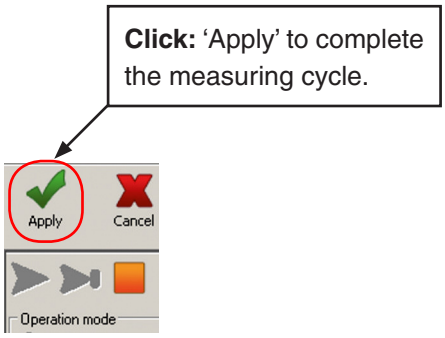
Click: 'Inspect'.



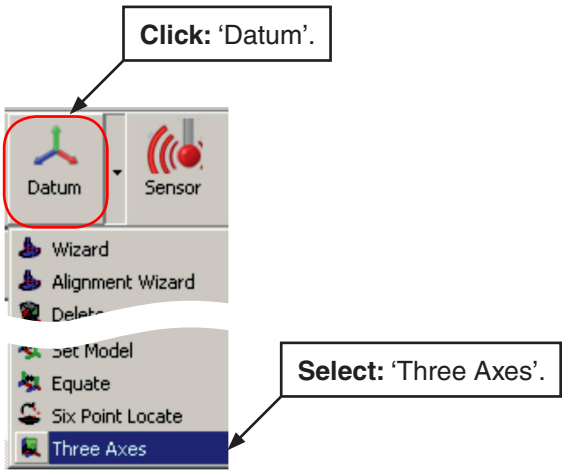
Select: 'Point'.

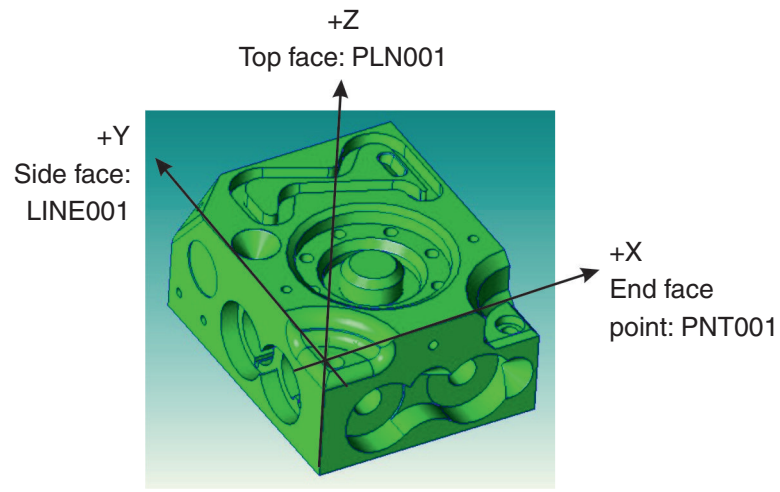
Take 1 point on the side:

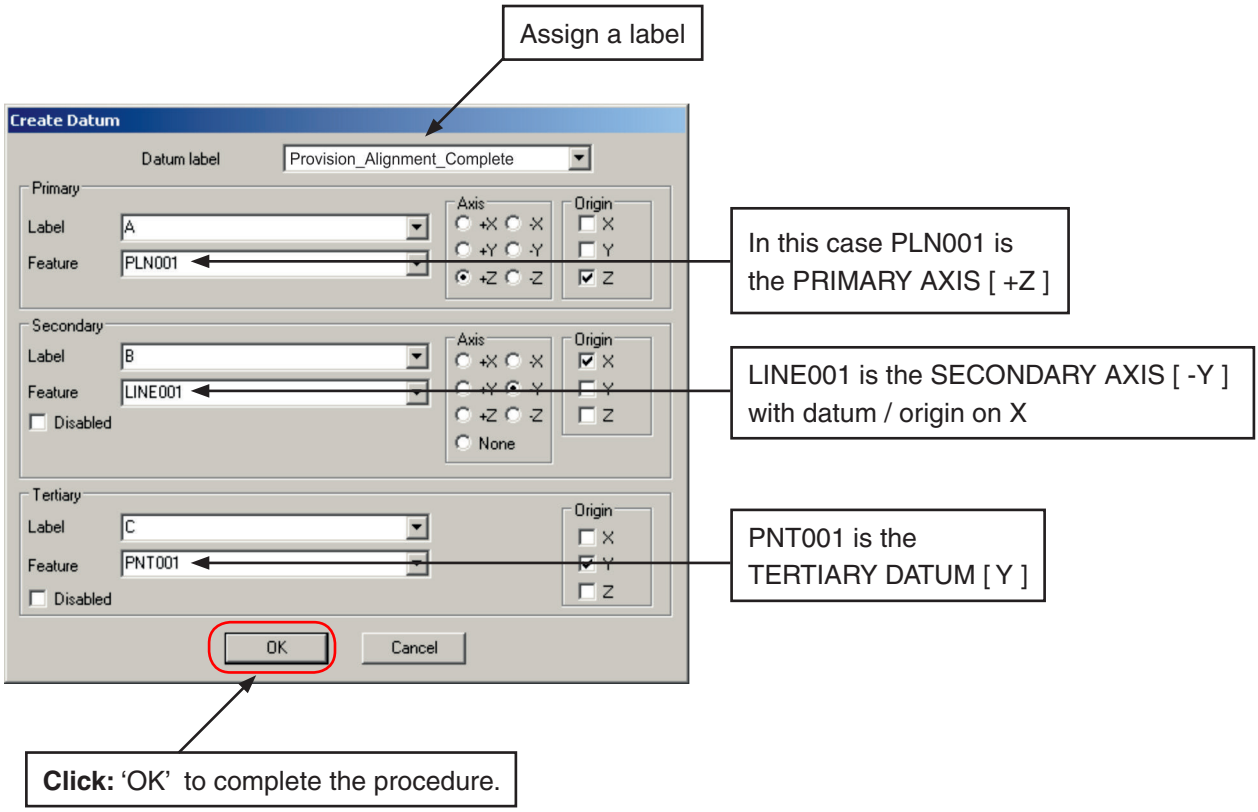




To complete the alignment using the features measured click 'Datum' then select 'Three Axes':







Finally click on 'Datum' then select 'Save' to complete the alignment process.

THE PART ALIGNMENT IS NOW COMPLETE AND IS READY FOR MEASUREMENT.

NOTE: This is a very basic manual alignment using minimum points and is not accurate enough for good metrology.

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